TECHNICAL BULLETIN

October–November 1990   Issue 12

Apple Debuts the *Education Technical Bulletin*

If you missed the announcement in the August issue of the *Apple II Technical Bulletin,* you may wonder why this issue looks different from those you've received in the past. October is the first month for the *Education Technical Bulletin*—a publication designed to better meet the information and support needs of the *Apple II Technical Bulletin* audience, virtually all of whom are Apple K–12 education customers.

The *Education Technical Bulletin* covers both Apple® II and Macintosh® computing solutions for the K–12 marketplace, maintaining its focus on Apple II products and adding coverage of the Macintosh solutions now widely used in the K–12 environment.

Exemplifying the coverage you can expect from the *Education Technical Bulletin,* this month's feature on HyperCard® Version 2.0 and the Educator HomeCard™ brings you details about an important education product that might have been mentioned only peripherally in the old format.

Although the *Apple II Technical Bulletin* is no longer available, this month subscribers received a HyperCard stack containing all the 1988 and 1989 issues of the *Apple II Technical Bulletin.* The 1990 issues will be distributed to subscribers with the February–March 1991 issue of the *Education Technical Bulletin.* New subscribers will receive the complete set of disks in the Starter Kit.

Welcome to the *Education Technical Bulletin.* We hope you'll find that the publication addresses a broader range of the information you need, and that convenient access to back issues of the *Apple II Technical Bulletin* provides you with a useful support resource.

HyperCard 2.0 and Educator HomeCard

By John R. Huber
of Apple's Technical Information Services Department

When Apple HyperCard software was introduced, it gave Macintosh users unprecedented power over their computing environments. Thanks to Hyper-Card, virtually anyone can assemble customizable interactive lessons and presentations that combine text, graphics, sound, animation, and video. HyperCard makes it possible to control laserdisc, CD-ROM, and videotape devices from a Macintosh personal computer. It is also ideal for teaching basic computer programming. As expected, thousands of educators, at all levels, have taken advantage of the power and ease of use of HyperCard to create sophisticated courseware and presentations.

HyperCard is especially well suited for new users and novice programmers, who can use it to quickly create their own software and customize software created by others. It is ideal for fast interface prototyping as well as final product development.

Now Apple has introduced HyperCard Version 2.0— a major revision that adds substantial new features and internal changes, and offers new programming ease, speed, power, and freedom.

HyperCard 2.0 has more than a hundred new features. Among the most significant are:

- Variable card sizes

- Multiple windows

- Styled text in fields

- Hot Text (hypertext)

- Icon Editor

- All-new printing and reporting capabilities

- 60 new HyperTalk® commands

- Faster HyperTalk execution

- All-new manuals and sample stacks
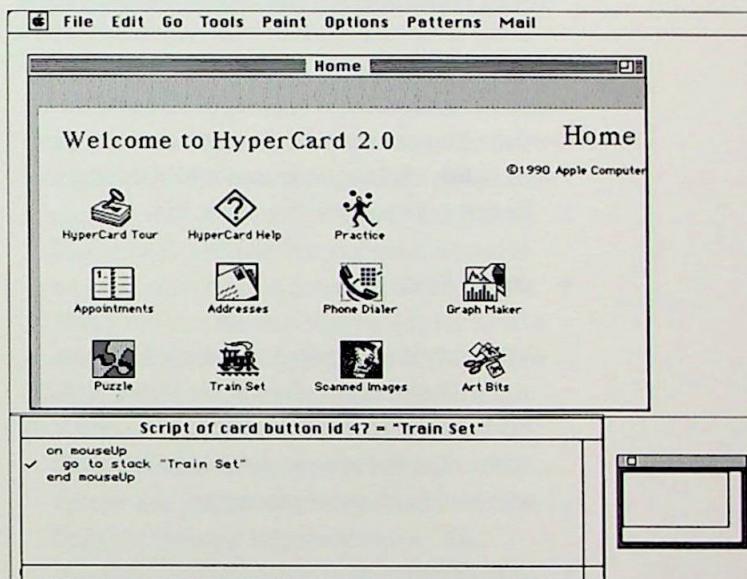
Features of HyperCard 2.0

Here is an overview of the new features of Hyper-Card 2.0 and its HyperTalk scripting language.

- **Variable Card Sizes**

  With HyperCard 2.0, you can create stacks with a card size as small as 64 pixels by 64 pixels (less than 1 inch square) or as large as 1,280 pixels by 1,280 pixels (almost 18 inches square), depending on available memory. There are ready-to-use settings for compact Macintosh screens, standard 640-by-480 modular Macintosh

monitors, and several other common screen sizes. All the cards in a given stack must be the same size, but you can change that size at any time.

- **Multiple Windows**

With HyperCard 2.0, you can view several stacks at the same time, each in its own window. On a typical 1MB Macintosh system, you can open two to four stacks at once, depending on their size. You can move from one stack to another by simply clicking on its window. Copying and pasting between stacks is faster, too.

- **Styled Text**

You're no longer limited to a single font, size, and style of text in a given field. HyperCard 2.0 has Font and Style menus that let you control the appearance of each character—just as you do with Macintosh word processors.

- **Icon Editor**

The new Icon Editor makes it easy to edit existing HyperCard icons, create new icons, even "pick up" a part of a HyperCard bit map and turn it into an icon.

- **Hot Text**

HyperCard 2.0 includes new HyperTalk functions and a new "Group" text style, which together let you create hypertext applications. With Hot Text, you can click on a word as though it were a button, and cause something to happen: play a sound, see a picture, get help.

The Group style lets you group several characters or words together, creating a sort of invisible button. (The Group text style by itself does not change the outward appearance of the text.) Then, when a user clicks anywhere on "grouped" text, the new functions return information about the word, line, or character the user clicked—and HyperTalk responds accordingly.

- **Printing Individual Fields**

You can now print any field in a HyperCard stack, independent of the other elements (graphics, buttons, other fields) that appear on the card with it. Scrolling fields can be printed in their entirety, regardless of how much text is visible on the computer screen.

- **Multiple Report Designs**

A stack can now have up to 16 report designs, and report designs can be copied and pasted between stacks. You can create generic formats for a variety of frequently used reports.

- **Report Layout Editor**

A new report layout editor lets you control the appearance and placement of each element in a report—including font, size, and style of text. You can create sophisticated reporting scripts that calculate, concatenate, or modify information in the report—as it is printed. Now you have more control over the appearance and content of HyperCard reports. Reports can produce totals and averages, and even call on other computer systems to generate report contents. Reports can also call HyperTalk scripts or even XCMDs (external commands) to build the contents of the report.

- **Color Images**

  HyperCard 2.0 is a monochrome product that works with all Macintosh systems, the overwhelming majority of which have monochrome displays. But HyperCard 2.0 can also display black-and-white, gray-scale, or color PICTs (PICT is Apple's QuickDraw™ picture definition) in a window that is separate from the card, but can be made to appear as part of the card. The Extended XCMD Interface supports the addition of color via external commands.

- **HyperTalk Capabilities**

  HyperTalk 2.0 has been enhanced with the following capabilities and features:

  —Higher speed. HyperTalk now has an automatic runtime compiler. The first time a script is run, it's compiled and stored in RAM. After that, each call to the script runs the compiled code. HyperTalk 2.0 scripts execute at least twice as fast as earlier versions, and some will execute many times faster.

  —Background processing. With HyperCard 2.0, HyperTalk scripts and XCMDs can now run in the background under the MultiFinder® system software. Handlers continue to run even after the user switches from HyperCard to the Finder™ or to another application program. Now, while complex or time-consuming scripts and XCMDs are running (compacting or sorting a stack, for example), you can go on with other tasks.

  —Modeless script editor and source-level debugging. The modeless script editor allows stack designers to view several scripts at the same time, and provides for quick copying and pasting between scripts. Search and replace capability has been added, and you can import text from, or export it to, other files. The new Script Editor also provides a suite of advanced symbolic debugging tools: breakpoints, single stepping, trace and jump, real-time observation of message passing, and examination of global and local variables.

  —User-definable menus. You now have more control over HyperCard menus: You can delete, enable, disable, rename, or reorder menus and menu items. And you can change the names, fonts, styles, and functions of menu items, as well as create custom menus and menu items. This gives you the flexibility to quickly build a wider range of custom software with the "look and feel" of the Macintosh user interface.

  —User-definable message inheritance. This feature lets you insert, reorder, and delete stacks from the message inheritance path. The message-passing hierarchy of HyperTalk has always included HyperCard itself and the Home stack. With HyperCard 2.0, you can add stacks to this hierarchy, making their resources (sounds, pictures, icons, XCMDs, and so on) available to other stacks.

  —Extended XCMD Interface. An enhanced XCMD interface allows programmers to create extensions to HyperCard and create their own windows and menus. The interface also allows XCMDs to run in parallel with HyperCard and to set up timed events, multiple processes, and even take over the sound channel. Advanced programmers can use the Extended XCMD Interface in HyperCard 2.0 to add custom code for database management, on-line systems, and multimedia applications.

- **New Stacks and Manuals**

  The manuals and sample stacks for HyperCard 2.0 are all-new. The sample stacks are designed specifically for users who want to use Hyper-Card right away for personal productivity, users who want to customize and create stacks without programming, and power users who want to get right into HyperTalk. Everything has been redesigned to be "task oriented"—that is, to focus on things users want to accomplish with their computers, rather than on what HyperCard is and how its parts work.

  The new books cover a broad spectrum, from a beginner's guide for those just getting started with HyperCard, to advanced reference material for experienced HyperCard users.

How to Get HyperCard 2.0

The HyperCard 2.0 upgrade kit (four 800K floppy disks and two manuals) is published by Claris Corporation. It has a suggested retail price of $49.00. HyperCard 2.0 is also included at no extra charge with all new Macintosh systems being shipped by Apple.

And for a limited time, educators can receive a free copy of HyperCard 2.0 (see "Educator HomeCard," page 11).

System Requirements

HyperCard 2.0 runs on any Macintosh 512K Enhanced personal computer or later model that is equipped with at least 1MB of RAM and System Software Version 6.0.5 or later. To use HyperCard 2.0 with MultiFinder, you'll need at least 2MB of RAM (this is also true of many other Macintosh software products). HyperCard 2.0 itself occupies about 625K of disk space, so a hard disk drive is strongly recommended.

The speed of HyperCard is generally independent of RAM, although some operations are faster with more memory, because HyperCard caches as much information as possible in RAM.

Compatibility

HyperCard 2.0 can open and run stacks created with earlier versions of HyperCard. Until you convert them to the new format, such stacks are read-only files—that is, you can't change them with HyperCard 2.0.

To convert a stack for use with HyperCard 2.0, simply:

1. Make a copy of the stack you want to convert. (Once a stack is converted to HyperCard 2.0, it can no longer be read by earlier versions of HyperCard. So, if you have a stack that will need to be used with an earlier version of HyperCard, make a copy of it before converting it.)

2. Open the stack from HyperCard 2.0.

3. Select "Convert Stack" from the File menu.

HyperCard 2.0 works with MultiFinder, but it is recommended that you do *not* run both HyperCard 2.0 and an earlier version of HyperCard at the same time.

HyperCard works with the A/UX® operating system just as it does under the Macintosh operating system. HyperCard 2.0 requires A/UX 2.0.

Educator HomeCard

The Educator HomeCard software consists of ten HyperCard 2.0 stacks designed especially for educators.

The ten stacks (one of them is a special Home stack) in the Educator HomeCard set are designed to work together, and there are many useful links among the stacks. For example, while recording a student's grades in the Gradebook stack, you can jump to that student's home phone number or address.

Three kinds of stacks are included with Educator HomeCard:

- Ready-to-use tools for classroom management. These include a seating chart, a gradebook, and a place to store other student information.

- Tools for planning and scheduling lessons. This group includes a daily planner, a database for creating and storing lesson plans, and a presentation tool that helps to deliver those lessons.

- Stacks that teachers can use in designing their own stacks. There is a stack of clip art, a stack of database ideas, and a stack full of ideas for using HyperCard 2.0 in teaching.

Following is a short description of each stack.

Seating Chart

Besides letting the teacher know who is who and where everyone sits, this stack is also the gateway to all the information a teacher keeps about students. For example, clicking a student's name in the chart takes you immediately to the student's data file or gradebook records. And you can use the HyperCard drawing tools to add classroom features such as lab benches, doorways, and computers.

Seating Chart			Class Math	
Roger Knight	Jim Pollard	Sue Collins	Jeff Orloff	Jim Ney
James Paul	Paul Jurata	Rosemary Brown	Karen Pinder	Peter Green
Jim Sanner	Dave Moore	Cindy Boudette	Kathleen Nolf	Sharon Slayton
Miriam Medoff	John Bromley	Anne Batey	Allan Dunne	Empty
Dave Weaver	Dave Gewirtz	Earl Phillips	Keith Eisley	Empty

Gradebook

Gradebook	Class Math		
	Date 6/13/90	Points 100	

Assignment	Math 1		

Student	Score	Percentage	Letter Grade
Cindy Boudette	98	98	A
John Bromley	80	80	B
Rosemary Brown	76	76	C
Sue Collins	99	99	A
Allan Dunne	82	82	B
Keith Eisley	95	95	A
Dave Gewirtz	81	81	B
Paul Jurata	80	80	B
Roger Knight	100	100	A
Miriam Medoff	98	98	A
Dave Moore	87	87	B

Class Average 86.2

Besides storing a whole term's numbers, the Gradebook stack computes class and student averages, and converts raw scores to percentages and letter grades. You can keep separate records for homework, quizzes, and final exams, and adjust each grade's weight in preparing final grades. You can sort the gradebook, either alphabetically or by grade, and print cards for the entire class or for an individual student.

Gradebook	Class Math		
	Date Wednesday, June 13, 1990		

Student	Sue Collins		

Assignment	Score	Percent	Letter Grade
Polar Coordinates	99	99	A
Addition with Regrouping	86	86	B
Areas of Solids	89	89	B
Counting to 10	82	82	B
Boolean Algebra	97	97	A
Imaginary Numbers	100	100	A
Conic Sections	74	74	C
Subtraction of Two Digit Numb	84	84	B
Topography for Beginners	63	63	D
Balancing a Checkbook	67	67	D
Addition Facts	85	85	B

Student Average 79%

Student Information

Student Information	Class Math	
	Date 6/14/90	

Name	Sharon Slayton	
Nickname	Sharon	M F
Address	1298 Kelley St. Portland, OR 97204	
Parent Name	Bill and Rosa Slayton	
Day Phone	555-3967 Home Phone 555-7823	
Grade	6 Emergency Phone 555-4433	
Birthdate	Monday, June 12, 1978 Age 12	

Comments: Sharon is allergic to all types of dairy products. Rosa went to this school as a child. Referred for vision testing 6/14/90. Excused absence 5/16/90.

This is a place to keep essential data about your students: parent or guardian names and addresses, phone numbers, gender, birth date, and your own comments. Student Information is a database that lets you search for particular types of information: all students born in May, for example. Report-writing features let you prepare class rosters, mailing labels, and so on.

Planner

This is a scheduling calendar designed especially for teachers. Besides helping you schedule lessons, parent meetings, and assemblies, the Planner offers "hot links" to your lessons. For example, suppose you're planning to teach about sedimentation during Earth Science on July 25. On the calendar, you click that date. A card showing your schedule for that day appears. Click the appropriate time for Earth Science to link to your database of lesson plans, and find the appropriate lesson. Linking back to the Planner automatically schedules that lesson for the correct date and time.

When July 25 approaches, you might check the date again to see what is scheduled. This time, clicking the time for Earth Science takes you directly to your lesson plan on sedimentation, so you can review or print it.

Planner   Calendar   Notes Dinner at Mary's Steak House   7:30

Date	Wednesday, July 25, 1990

| Schedule	Planned Activities
Before School	
Earth Science	Sedimentation and the Fossil Record
Algebra I	Similar Polygons
Life Science	
Prep	Conference with Jeff Orloff
Lunch	
Algebra II	Roots of the Quadratics
Careers	Check on getting City Manager
General Math	
Football	Work with receivers. Get parental permission for R. Knight
After School	Dinner with André

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Lesson Plans

Teachers can use this stack to write and keep track of lesson plans. There's space to describe all aspects of a lesson, including objectives, resources needed, preparation, activities, and evaluation. While writing the plan, you can choose several key words to help in retrieving the lesson. The Look For card lets you select any of the keywords from an indexed list. The lessons that use that keyword are found and listed as Titles Found. Clicking a title takes you to that lesson plan.

Lesson Plans   Subject Earth Science   Grade Level 7

Title	Sedimentation and the Fossil Record
Description	Show how fossils can be dated by the sediment layer
Keywords	fossils,sediment,Chapter 7

Objectives	Resources	Evaluation	Preparation	Activities

Video tape: The Ages of the Earth   Library # 566-8976-2
Photo of archeological dig -- Nat. Geographic 6/87
Chapter 7: Our Scientific World

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Presentation Sample Index

Blank Card   Index Card   Bullet Card   Black Card   Headline Card

Banner Card   Map Card   Flip Card   Columns Card   Essay Card

Large Screen Bullet Card
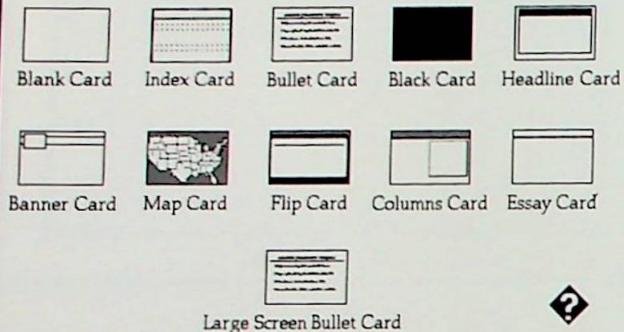
Presenter

This stack helps organize lessons and put them in a format perfect for printing on paper or overhead transparencies, or projecting from a Macintosh computer. After you choose from a number of templates, you can create a stack with that template as the background. The layouts and text fonts are up to you. Students may also use this stack to create their own presentations, which can combine text and graphics.

Database Ideas

Classroom Resources   Staff Information   Card Catalog

Software Library   Supply/Equip. Inventory   Reading List

Textbook Inventory
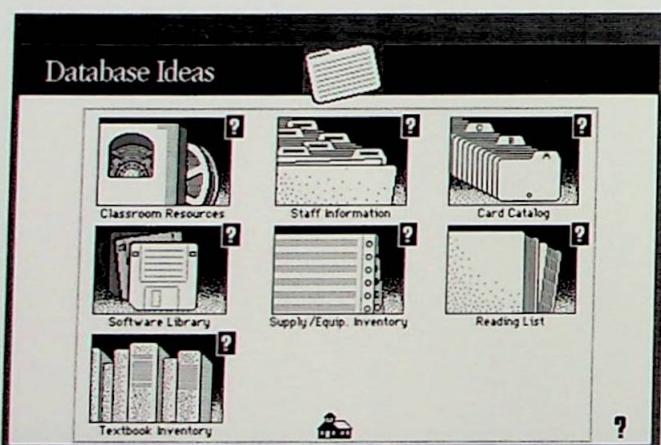
Teacher Resources

This is a collection of eight database ideas, which you can use as they are or modify to match your needs. The stacks include templates for managing classroom equipment, books, and software; a card to keep track of special education requirements; and a book report template.

School   3 of 3

Winners, Chalkboard, Apple, Diploma, Microscope, Calculator, Pencil, Books
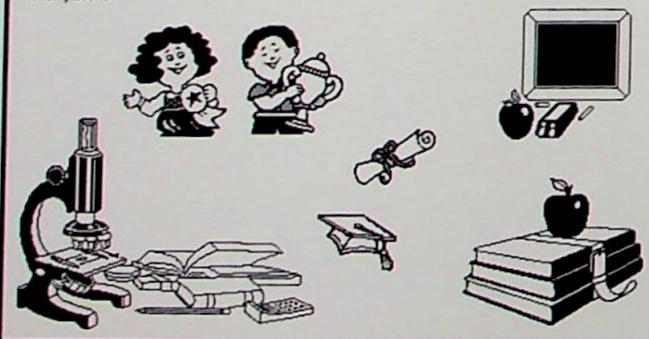
Classroom Clip Art

You can use the art in this indexed collection to dress up reports, newsletters, and presentations. The collection includes pictures related to school objects, animals, transportation, holidays, history, entertainment, and sports.
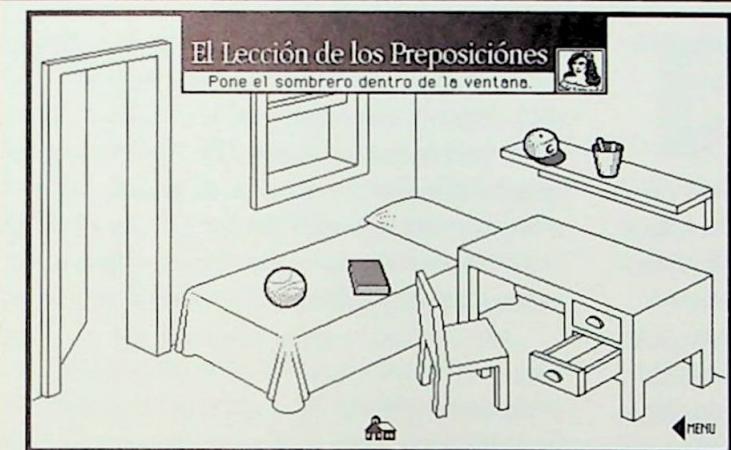
Example of HyperCard interactive lesson. This lesson features a digitized voice and animation to teach a lesson in Spanish. After clicking the icon of the señorita, students are told in Spanish to place one of the objects somewhere in the room. The señorita tells them whether they are right or wrong.

Classroom Ideas

This is a collection of ideas for using HyperCard throughout the curriculum. These working, interactive lessons use pictures, sound, animation, and computation. There are lessons for students of every age in a variety of subjects. You can use them as they are or as models for creating your own lessons. The titles are Shapes, Thermometer, Era of Exploration, Cartesian Plane, Preposiciónes, Plot Machine, and Pre-Writer.

Until December 31, 1990—or while supplies last—educators can get a free copy of Educator HomeCard and HyperCard 2.0 by writing to:

> Intellimation
> 130 Cremona Drive
> P.O. Box 1922
> Santa Barbara, CA 93116-9954

The Educator HomeCard does not include the stacks and manuals that are included with the HyperCard 2.0 kit.

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Slipstream Solutions: HyperCard School Products

Two applications from Slipstream Solutions provide K–12 personnel with tools for managing student information.

Student Manager is an entry-level school administration system for small to medium-size local area networks (LANs). A HyperCard-based application, it allows administrators to monitor student data and the delivery of services in the following areas: cultural and demographic, emergency and medical, discipline (positive and negative), counseling, crisis intervention, student review, gifted and talented students, special services, reading, retentions, computer remediation, and test data.
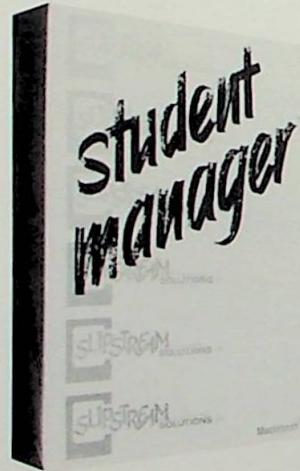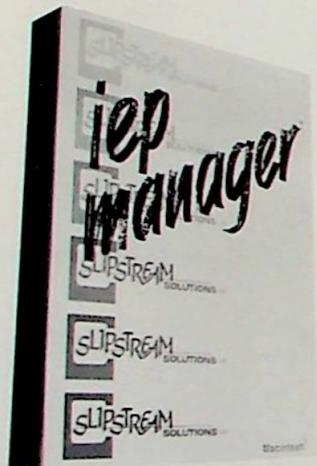
IEP Manager provides special-education personnel with a comprehensive solution to the task of authoring Individual Education Plans (IEPs). Also a HyperCard-based application, IEP Manager provides user-editable libraries of needs, goals, and characteristics of services. The IEP Manager allows users the flexibility to create personalized IEPs, while providing rapid composition of standard IEP segments.

Easy to learn and to use, IEP Manager generates a professional-looking IEP. Data sections include demographics, needs, procedural dates, social, educational/developmental/vocational, psychological, annual measurable goals, characteristics of services, services to be provided, behavior and study habits, oral communication, written communication, persons attending, consent, placement, implementation plan, and classroom modifications. Separate summary and classroom modification reports are also provided.

For more information, contact Slipstream as follows:

Slipstream Solutions Ltd.
2 West Dry Creek Circle, Suite 100
Littleton, CO 80120-4413
1-800-321-7685
AppleLink®address: SLIPSTREAM

Public Domain Software for the Apple II

By Jim Ferr, Technical Support Specialist
Apple Canada Inc.

There are many shareware, freeware, and public domain treasures in the Apple II "community chest," particularly for 8-bit Apple II computers. Much of this software is written by gifted amateur or professional programmers dabbling in their spare time. Here is a short list of my current favorites.

You'll find these hidden gems in the libraries of Apple user groups and on local bulletin board systems and major on-line information services such as GEnie, America Online, and CompuServe.

ShrinkIt
Developed by Andy Nicholas

ShrinkIt is to the Apple II what StuffIt is to the Macintosh: the current file compression or archiving standard. Why compress files into archives? The most common reason is to transfer the files by modem. By placing the files in an archive, you gain several things. An archive can hold several files, including a directory structure, or even entire disks. And data compression reduces the time (and expense) required to transmit or receive the files.

There are three versions of ShrinkIt to select from, depending on which Apple II system you have:

- II Plus UnShrinkIt (ProDOS®8)
- ShrinkIt v3.03 for the Apple IIe, IIc, and IIGS® (ProDOS 8)
- ShrinkIt IIGS v1.03 (GS/OS®)

The Apple IIGS® version of ShrinkIt even recognizes Macintosh and IBM compression formats, specifically StuffIt, ARC, ZOO, and Compress.
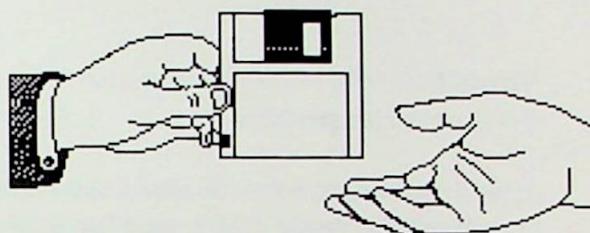
A2FX
Developed by Chan Wilson

While we're on the subject of foreign file formats, I have to mention A2FX, short for Apple II File Exchange, version .7 Beta—a program that can read files on Macintosh HFS disks and copy either or both "forks" of a Macintosh file to a ProDOS 8 or GS/OS volume. Unlike the Apple File Exchange program on the Macintosh, A2FX currently does not support transfers in two directions and does not perform custom file translations.

DiskWorks
Developed by Jerry Hewitt

This ProDOS block editor will come in handy if you want to examine ProDOS volumes on a block level, whether out of curiosity or to recover files or directories. Shareware; $10 from Living Legends Software.

FrEDWriter
Developed by Paul Lutus and Al Rogers

For many years the standard in word processing on the Apple II was AppleWriter™ II, which was incarnated in many versions until it was finally discontinued by Apple. FrEDWriter is a simple text editor with word wrap, find and replace, and some additional features for an education audience. At $5, the price is right.

VirusMD

Developed by Morgan Davis

Apple II users don't need to feel left out in the battle against computer viruses. The Apple II has its share of nasty diseases. VirusMD detects two of these: "Festering Hate" and "CyberAIDS." It can also repair the damage caused when either virus is activated. VirusMD is public domain software.

Source Convert

Developed by Herbert F. Hrowal

This handy utility converts assembly language source code from one assembler format to another, and runs on any Apple II with 64K of RAM and a 65C02 installed. Source Convert, or SC for short, converts Merlin to Orca/M, Orca/M to Merlin, Orca/M to Micol, and Orca/M to Lisa816. Shareware; $10 by Palace Productions.

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Farallon Computing: LocalTalk StarController Series 300

Farallon Computing has introduced the latest version of the PhoneNET StarController, an intelligent multiport repeater for LocalTalk® and Ethernet networks. The PhoneNET StarController Series 300 replaces the original "Black Beauty" StarController as one of the central components in Farallon's PhoneNET System.

Mounted in your telephone wiring closet, the StarController hub connects all network devices in a star configuration, repeating and amplifying signals over existing telephone wire. It takes advantage of the spare wires already running to most telephone jacks, eliminating extra cabling and making it possible to move users around a network as easily as you plug in a telephone.

With the StarController Series 300, you can extend your network to as many as 48 locations, and interconnect several StarController hubs and routers to support hundreds of users.

LED displays on the StarController give a summary of traffic on each of the 12 ports and alert you to signal errors. If the StarController detects a jamming error, it automatically disconnects the affected port so that the problem won't spread to the rest of the network. When the jamming clears, the Star-Controller automatically reconnects the port. In the event of a power loss, the StarController remembers which ports were turned on.

StarCommand 2.0 management software, included with the StarController, continuously monitors the network as a background application running under MultiFinder. You can switch ports on and off, and make a record of which users are connected to each port. You can also check the quality of the line running to each port and use StarCommand to analyze traffic statistics gathered by the StarController.

The StarController Series 300 also offers the following:

- Easy installation. The installer no longer needs to open the case. The StarController can be entirely configured using software, there are no DIP switches to set, and the new mounting bracket allows installation in any orientation required within the tight confines of a phone closet.

- Enhanced error detection. The StarController now identifies excessive noise (signals that are too short) and monitors noise packets, helping the network manager to detect and locate even intermittent wiring problems.

- Compatibility. The LocalTalk StarController fully supports all third-party AppleTalk® devices and all Apple personal computers, including the Apple IIGS and Macintosh IIfx.

A StarController upgrade due later this year will feature three-way management—network management access via a fault-tolerant management bus, AppleTalk network, or modem.

Compatibility Issues

The Macintosh IIfx and the Apple IIGS have implemented the physical layer of the AppleTalk protocol in a slightly different manner than previous Macintosh computers and other third-party products. The StarController Series 300 is the result of Farallon's ongoing compatibility research and is fully compatible with the Macintosh IIfx, the Apple IIGS, and all third-party AppleTalk products.

There is, however, a noticeable performance loss when using the original StarController with Apple's latest implementation of the AppleTalk physical layer in the Apple IIGS or the Macintosh IIfx, as found in Farallon's testing.

To enable the original StarController hub to network Apple IIGS and Macintosh IIfx systems with the level of performance provided by the StarController Series 300, Farallon offers GAL (Gate Array Logic) chip upgrades (part number FX207) for current StarController owners. Note that these performance problems do not occur in the new StarController Series 300, and that the upgrade for the original StarController hub does not increase the performance of networks that do not contain either Macintosh IIfx or Apple IIGS systems.

For ordering information, contact Farallon:
Farallon Computing, Inc.
2000 Powell Street, Suite 600
Emeryville, CA 94608
(415) 596-9000

Troubleshooting a LocalTalk or Macintosh-Based Network

Thanks to Apple's Support Technologies and Services Department for the following article.

Before beginning to troubleshoot a LocalTalk network, you'll need to familiarize yourself with network components. Refer to the *LocalTalk Installation Guide* or your network installation guide to make sure you can identify all the elements of a LocalTalk network.

You can then follow the directions in this article to select the appropriate troubleshooting for your LocalTalk network problem.

Begin by collecting the following:

- The *LocalTalk Installation Guide* or a network installation guide

- The *LaserWriter Owner's Guide*

- The LaserWriter® Installation Disk

- A cabling diagram for your network, showing each device on the network and the route of the cable that connects them

- A network administrator's troubleshooting utility, such as Inter•Poll® software (see page 27 for more information on Inter•Poll) or any similar network troubleshooting software

The following terminology is used in these instructions:

- A **node** is a LocalTalk or network connector and the computer attached to it.

- A **shared device** is a device, such as a LaserWriter printer or a file server, shared by several or all users on a network.

- A **network** is the entire connected length of LocalTalk cable and connectors, but does not include devices connected through routers or gateways to other networks.

Keep in mind that troubleshooting may interfere with the use of the network. If possible, perform troubleshooting procedures when there is limited or no network activity, such as at lunch time or in the evening.
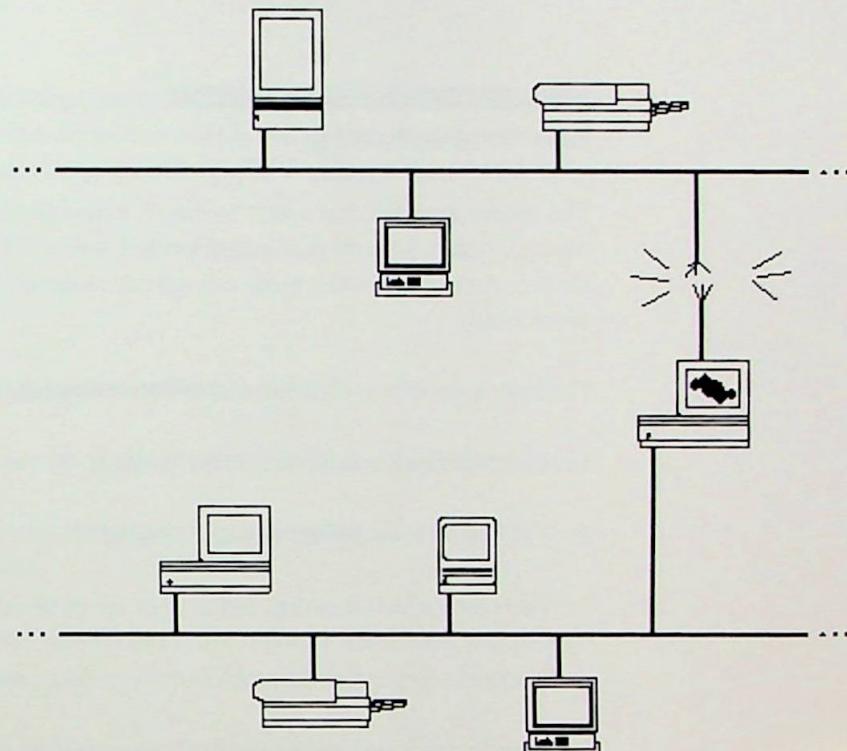
Basic Troubleshooting

This section is a reference source to help you troubleshoot networks and internets. Because every LocalTalk network system is set up in a unique location with a unique layout of nodes, every network problem is unique. A troubleshooting guide can provide strategies for solving these problems, but it cannot provide a list of solutions.

The basic approach to all network troubleshooting can be reduced to the steps below:

1. Clearly define the symptoms of the problem.

2. Verify that the symptoms are network-related.

3. Determine which networks and devices are involved.

4. Isolate the location of the problem through diagnostic tests.

5. Visually check and correct any hardware problems at the location.

6. Correct any software problems at the location.

This article helps you identify possible network problems and recommend an appropriate course of action. In the course of troubleshooting your network, you will need to test individual nodes or shared devices. It is not within the scope of the article to describe how to test each individual device that may be attached to the network. Refer to the appropriate owner's documentation for the recommended procedure for verifying that a device is working properly.

Troubleshooting Strategy

When developing a troubleshooting strategy, a couple of processes help in finding the correct procedure and solution to the network malfunction.

- Look at the big picture. It is helpful to maintain a conception of the total network when addressing any malfunction. The network map is your most useful ally in visualizing the relationship between devices.

- Use a logical, top-down sequence. The troubleshooting process is a sequential series of tasks designed to isolate the location of a problem. It is helpful to have network troubleshooting software to monitor the network, and—depending on the results of this search—proceed to localized testing at the network or device level.

Internet Checks

1. Make sure affected devices are on the same network or interconnected networks.

2. If all devices on a network are missing from a device list, the problem is most likely to be bridge-related.

3. Make sure that bridges or routers have been properly configured. Check operation and installation manuals for bridge or router hardware and software.

4. If the network medium is Ethernet, check the EtherTalk® hardware and software installation, and refer to the appropriate documentation.

Workgroup Checks

1. Check for disconnected cables.

2. Check and tighten all network connections, including connector boxes and cable extenders.

3. If the medium is LocalTalk or thick or thin Ethernet cable, check that the network is installed with devices in a line instead of a closed loop (other Ethernet media may have different layout conventions).

4. Check for proper network termination, as described in the setup manuals.

Localized Device Checks

1. Is the affected device turned off?

2. Is the affected device attached to the network?

3. If the medium is LocalTalk, is the LocalTalk connector attached to the printer port?

4. Check for appropriate versions of system software.

5. Check for correct LaserWriter driver software.

6. If the device is a Macintosh, make sure the AppleTalk option is set to Active in the Chooser.

7. If the device is a Macintosh on EtherTalk, make sure the EtherTalk option is selected in the Control Panel network options (refer to the *EtherTalk User's Guide* for details).

Troubleshooting a Missing Network

Follow these steps if one or more networks are missing from the network troubleshooting software device list:

1. Consult the network map to determine the location of the missing network relative to the network administrator's workstation.

2. Perform a device listing of the zone containing the missing network, and then determine from the network map which device is the last responding node on the path to the missing network.

3. Go to the location of this last device and follow local troubleshooting guidelines:

   • Check connectors and cable termination.

   • Check the bridge connecting the missing network to the "visible" part of the internet. Refer to the owner's manual for the device.

4. Repair or replace any malfunctioning devices or cables and try again to list the network.

5. If you find no visible break, and local checks of hardware and cabling fail to solve the problem, install the network troubleshooting software on a Macintosh connected inside the noncorresponding network (preferably the Macintosh farthest from the network's connecting bridge).

   • Perform a listing of all the devices of the local zone. (If you're using Inter•Poll, perform an All Named Devices listing; then select sorting by Net to make the device list easier to read.)

   • Compare the device list with the network map.

   • If any device within the network is missing from the list, follow local troubleshooting guidelines at that location.

6. If no trouble source is located in Step 5, perform loopback tests from the network administrator's workstation inside the network. Testing individual devices with loopback tests allows you to check for data loss, and for the possibility of network path changes due to bridge malfunctions or traffic congestion. (If you're using Inter•Poll, use the Device Test window to view results from network loopback tests.)

    • First check the bridge or router connecting the network to the internet.

    • If you receive no response, test each contiguous device starting from the bridge until the break is isolated.

Troubleshooting a Missing or Intermittent Device on the Network

Follow these steps if one or more devices are missing from the network troubleshooting software list:

1. Consult the network map to determine the location of the missing device(s), relative to the network administrator's workstation.

2. Go to the location of the missing device(s) and follow local troubleshooting guidelines:

    • Check connectors and cables.

    • If the device is a Macintosh, make sure the LocalTalk connector is attached to the printer port.

    • If the device is a Macintosh, make sure AppleTalk is set to Active in the Chooser window.

    • If the device is a Macintosh, and if you are using Inter•Poll software, make sure that it's running the correct version of the Responder software, and that this program is located in the System Folder.

3. Repair or replace any malfunctioning connectors, cables, or software, and return to listing the device.

4. If you receive no response, and if you cannot see any network services from the affected workstation's Chooser, the problem may be caused by the device's internal network connection hardware. Try substituting a known working device, and consult your hardware service representative about the malfunctioning unit.

Follow these steps if one or more workstations are receiving erratic, slow, or occasional interrupted service from a LaserWriter or file server:

1. Display a *device list* to verify that the affected devices are registering properly.

    - If a device is missing from the list, follow steps 1–4 on page 21.

    - If all devices are listed, the symptoms may be the result of an intermittent connection. Follow steps 2–4 below to isolate the location and troubleshoot.

2. Consult the network map to determine the location of the affected workstation relative to the offending printer or server.

3. Take a copy of Inter•Poll or similar network software to the affected workstation, and begin testing devices in the path to the printer or server from there. Perform a loopback test on the nearest device first, and test successive devices until results indicate a loss of test packets. This will isolate the network segment where the intermittent break is originating.

4. Perform local troubleshooting at the location of the intermittent break. Check for physical breaks in the network or for software incompatibility.

Troubleshooting a Missing Zone on the Network

Follow these steps if one or more zones are missing from a user's Macintosh Chooser window or the zone display window. (This applies only to networks containing more than one zone.)

1. Consult the network map to determine the location of the missing zone(s) relative to the administrator's workstation.

2. Select the zone that is adjacent to the missing zone and nearest to the administrator's workstation, and perform a device listing to reveal the possible break point. Verify that all networks are present in this adjacent zone.

3. Determine from the network map which device is the last responding node on the path to the missing zone.

4. Go to the location of this last device and follow local troubleshooting guidelines:

   • Check connectors and cable termination.

   • Check the bridge or router connecting the missing zone to the visible part of the internet. Refer to the owner's manual for this device.

5. Repair or replace any malfunctioning device or cables and retry listing the zone.

6. If you found no visible break, and local checks of hardware and cabling fail to solve the problem, install Inter•Poll or similar software on a Macintosh connected inside the nonresponding zone (preferably the Macintosh farthest from the zone's connecting bridge).

   • Perform a device listing query.

   • Compare the device list with the network map.

   • If any device within the zone is missing from the list, follow local troubleshooting guidelines at that location.

7. If no trouble source is located in Step 6, perform loopback tests from the workstation inside the zone.

   • First check the bridge or router connecting the zone to the internet.

   • If you receive no response, test each contiguous device, starting from the bridge or router, until the break is isolated.

Eliminating Duplicate Addresses on the Network

Whenever a node starts up on the network, it assigns itself an address number. Before the node can assign itself an address number, it must check to make sure that there is not another node already using that address. It does this by transmitting a message containing the address it wants to use. If there is another node on the network with that address, the second node will respond to the inquiry, at which point the original node will pick another address and try again, until it finds an address that is not already being used. The node then claims that address as its own until the node is turned off, restarted, or disconnected from the network.

Starting up a node while it is not connected to the network, and then connecting it, can cause duplicate addresses. This happens because, if the node is not connected to the network when it is started up, the other nodes on the network cannot respond to the inquiry about its address.

When two nodes have the same address, both will respond when that address is used—a condition that causes the workstations on the network to be unable to find the particular shared devices. Therefore, it is important to distinguish each node with a different address name.

Starting up each bad node while it's connected to the network causes it to perform a proper address inquiry, thereby eliminating any possible duplicate addresses.

Checking Software Compatibility

A frequent source of trouble among network devices is software incompatibility. The following are common varieties of this problem that can be checked at the local node level.

- System software version inconsistency. Any node can cause network problems if it is operating with system software that differs from the network standard. Symptoms might be limited to the offending node, or might affect network performance in other ways.

- Local device check. Software versions can often be checked at the affected workstations with the About commands from the Apple menu, or the Get Info commands from the File menu.

- Remote networkwide check. If you are using Inter•Poll, a listing of system software versions can be displayed for a network-, zone-, or systemwide selection of Macintosh workstations, using the Get System Info command from the Special menu.

- Driver incompatibility. Most network servers, including LaserWriter printers, file servers, and electronic mail applications, have associated controller programs called drivers that must be installed on every workstation using the service. When a network service fails to respond, the cause may be an incompatible software driver at the workstation requesting service.

  LaserWriter printers are particularly sensitive to the version numbers of Macintosh LaserWriter drivers. Use Inter•Poll or similar software to make sure that all workstations are running the same versions of these files.

Usually, but not always (depending on the service type), an error message indicating an incompatible driver version will be presented at the requesting workstation. It will be necessary to remove the incompatible driver, install the appropriate version, and restart the system before service to this workstation can be resumed. Use the appropriate installation program.

- Printing errors. Errors can occur during the internal file formatting that precedes LaserWriter printing, resulting in the failure of the LaserWriter to respond. For example, the text formatting software may encounter a printing command that cannot be executed with the current font capabilities, causing a system error. This problem may not be described by an on-screen message, causing the transmission failure to appear network-related. To verify that the necessary printer software is present, check response by printing a different file from the same workstation.

Breaks in Network Connections

When a break occurs on the network, nodes on opposite sides of the break can longer "see," or communicate with, anything on the network beyond the point of the break.

In addition, network performance may become erratic even among nodes situated on the same side of the break, due to the possibility that a network cable is improperly terminated (see the next section, "Intermittent Connections and Cable Termination").

There are three principal types of network breaks to look for:

- Break at connector box. If such a break occurs, the affected node becomes the network termination node for the side of the network that remains connected. Devices on this side may continue to operate properly, but will have no contact with devices beyond the termination point. The disconnected side is improperly terminated, and is likely to experience performance problems in addition to the break in communication.

- Disconnected cable extenders. Cable extension connectors can become unplugged when moved around. If this happens, each side of the break will become an improperly terminated network, and will experience associated performance problems.

- Severed cable. Most network cable is sturdy, but breakage can still be caused by extreme stress, such as moving heavy furniture over cables. A severed cable will produce the same symptoms as unplugged cable connectors.

Intermittent Connections and Cable Termination

When a network connection is loose or damaged without breaking completely, communication becomes intermittent between nodes on opposite sides of the problem site.

There are three principal causes of intermittent connections to look for:

- Loose connector contact. LocalTalk connector boxes are often moved, and attached nonlocking cable connectors can easily become loosened. These connectors should be checked and tightened whenever devices are moved.

  When properly installed, LocalTalk connectors lock into place. Older AppleTalk Personal Network connectors do not lock; they require third-party retention devices to help secure cable connections.

- Loose cable extenders. Nonlocking connector cables may cause this problem, although no break in contact may be visible. When checking for intermittent connections, completely unplug and reconnect the cables to make sure that contact exists.

- Damaged cable. A LocalTalk cable that has been damaged may still be capable of intermittent throughput, with occasional breaks in transmission. This may be the most difficult of network faults to detect if no external cable damage is visible. Inter•Poll or similar software may help to isolate the location of a throughput problem to a particular part of the network; replacing the cable in this location is a troubleshooting option.

Cable Termination

LocalTalk and Ethernet cabling systems use a bus topology, in which devices are strung out along a cable that terminates with a connector box (or terminator, for EtherTalk) at each end. A properly terminated LocalTalk network has no dangling cable extending beyond the terminating connector box.

Ethernet requires a separate terminator at each end of a network segment. Ethernet is available on various cable media (including twisted-pair and fiber-optic cables), which have different termination requirements. Refer to the appropriate instructions for the termination requirements of your cable media.

LocalTalk and Ethernet do not support a continuous loop of cable, or any T-shaped arrangements of devices. This means that for the network to operate correctly, it must be properly terminated with a node.

Inter•Poll

The Inter•Poll Network Administrator's Utility is a group of tools used to test the integrity of the path from a workstation to any device on the AppleTalk network. Eliminating many network problems before they get to the user, Inter•Poll works by generating screen displays of workstations and other devices on the network. The displays, which can be printed on an ImageWriter® or LaserWriter printer, include zone names, node IDs, socket numbers, and device names and types. Inter•Poll can also query workstations that have the AppleTalk Responder, a workstation resource that helps Inter•Poll to report on the System, Finder, and LaserWriter software.

The Inter•Poll package includes the following:

- Inter•Poll software

- Network mapping tools (software drawing objects used to create network diagrams)

- The AppleTalk Responder

- Documentation (containing suggestions for network configuration, planning, maintenance, and trouble-shooting, as well as information on AppleTalk concepts and terminology)

For ordering information, contact your authorized Apple Desktop Communications dealer or your Apple representative.

AppleTalk on the Apple II Workstation

The following article, excerpted from the AppleShare Programmer's Guide for the Apple II, *outlines AppleTalk protocols and other services implemented by the Apple II workstation, and describes how the workstation starts up over the network.*

The Apple II workstation is designed to provide AppleTalk functionality similar to that built into the Macintosh computer. When connected to an AppleTalk network, the Apple II workstation can do the following:

- Start up over the network

- Access file and print servers on the network

- Print to a LaserWriter or ImageWriter printer on the network

Protocols and Services

Applications running on Apple II workstations can use their own high-level protocols, interacting with low-level AppleTalk protocols, to communicate with any network device. An application can make several types of calls: printing calls, network booting calls, filing calls for file service on the network, AppleTalk calls, and diagnostic or "housekeeping" calls.

The Apple II workstation processes the calls and data through its operating system, translating operating system filing calls to the appropriate AppleTalk protocol calls. When the translation is complete, the firmware on the workstation formats the data into packets and prepares to transmit it over the network to the server.

The Apple II workstation currently implements the following AppleTalk protocols in ROM or RAM:

- Link Access Protocol (LAP)

- Datagram Delivery Protocol (DDP)

- Name Binding Protocol (NBP)

- Zone Information Protocol (ZIP)

- AppleTalk Transaction Protocol (ATP)

- Printer Access Protocol (PAP)

- AppleTalk Session Protocol (ASP)

- Routing Table Maintenance Protocol (RTMP)

- Echo Protocol (EP)

In addition to the protocols, the Apple II workstation supports the following services:

- Remote Printer Manager (RPM) for transparent printer access. RPM emulates the Super Serial Card serial drivers for the serial port.

- Special calls to provide a timer interrupt.

- Code that allows an Apple II workstation to boot directly over the network from any server that supports AppleTalk Filing Protocol Version 2.0 or later.

- AppleShare® File System Translator (FST) for making calls from GS/OS.

- ProDOS Filing Interface (PFI), which translates ProDOS filing calls directed to AFP servers into AFP calls. PFI thus allows transparent ProDOS file access. Features of AFP that are not available through ProDOS calls can be accessed by AFP calls made directly through ASP. (Note that making AFP calls directly through ASP is discouraged when using GS/OS. Most AFP calls are available through normal GS/OS calls or FST-specific calls to the AppleShare FST.)

Requirements

In order to boot GS/OS over a network, all servers in a zone must be updated with the GS/OS booting software. As with GS/OS in general, all machines that need to boot GS/OS over the network must have ROM Version 01 or later.

Note that only ProDOS 8 and GS/OS applications are supported on the network. Other operating systems, such as DOS 3.3, are not supported.

Before starting up over the network, you must set up the Control Panel properly. If you have Version 01 ROMs installed, follow these setup guidelines:

- Set Slot 7 to "AppleTalk," and the startup slot to 7.

- If you connect the network connector to the printer port, then set Slot 1 to "Your Card," and set Slot 2 to either "Your Card" or "Modem Port."

- If you connect the network connector to the modem port, Slot 1 should be set to "Printer Port" and Slot 2 should be set to "Your Card."

If you have Version 03 ROMs and the network connector is connected to the printer port, follow these setup guidelines:

- Set Slot 1 to "AppleTalk."

- If the network connector is connected to the modem port, set Slot 2 to "AppleTalk."

- In both cases, set the startup slot to "AppleTalk." (Note that some older applications, such as Aristotle™ software, require that you set Slot 7 to "AppleTalk" as well.)

The Startup Process

As you power on (or reboot), the first-stage boot code is read from the server. To signify this, the first-stage boot code and the ROMs generate dots near the upper left corner of the screen.

As the second-stage boot code is loaded, the dots disappear and the server name is displayed in the middle of the screen. A "spinner" (a line that rotates in 45-degree increments) is displayed between the "Starting up over the network" message and the name of the server. The spinner indicates progress during the boot process by turning 45 degrees as each block is read in. The thermometer at the bottom of the screen is filled in proportionately to the amount of boot information read in. Figure 1 shows a computer approximately two-thirds of the way through the boot process.

Figure 1

Figure 2

If the connection with the server is lost (for example, after a request for time-out), there is a lookup for another server. You can tell that the connection has broken because the server name, the spinner, and the inside of the thermometer are erased. If a server is found, booting starts over. If a server is not found, the screen is cleared and control returns to the ROM to look for another server for the first-stage boot code.
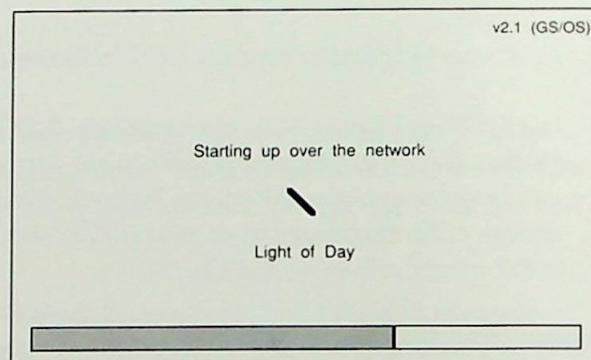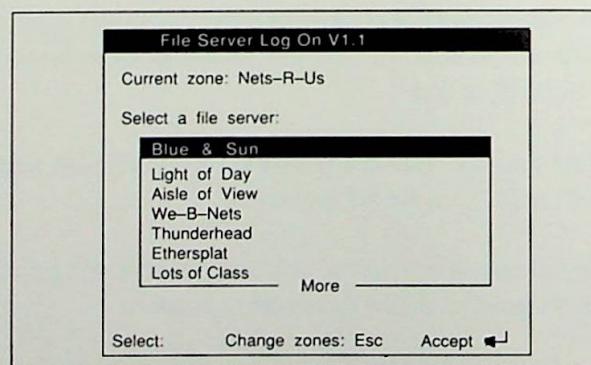
Once the AppleTalk protocols have been loaded
and initialized, the Log-on program is run. If
there are multiple zones or multiple servers in
your zone, you see the File Server List screen
(Figure 2). If there are no routers (and hence no
zones), the "Current zone" string is not displayed
and "Change zones: Esc" becomes "Cancel: Esc."
If you press Esc at this point, the log-on program
attempts to find a router. If a router is found, the
Zone Selection screen appears, as shown in
Figure 3. Once you have selected a zone (or if
there are no zones), you'll be returned to the File
Server List screen. (Pressing Esc from the Zone
Selection screen picks your current zone and
returns you to the File Server List screen.)

Once you have selected a file server (or if there
are no zones and only one file server), you must
decide how to log on to the system. The File
Server Log On screen is displayed (Figure 4).
You can choose to log on as a guest or as a
registered user. Pressing Esc returns you to the
File Server List.

When you choose "Log on as a Registered User,"
you must register. You are shown the Registra-
tion Screen (Figure 5). You must enter your user
name and password. If either is incorrect, a
message is displayed and you'll be asked to try
again.

Once you have successfully logged on to the
server, you are presented with a list of volumes
on the server, as shown in Figure 6. If there are
no zones, only one server, and only one volume
on the server, this list is not displayed and the only
volume is automatically mounted. Volumes with a
check mark next to their names will be mounted
when you press Return. Use the up- and down-
arrow keys to move through the list of volumes.
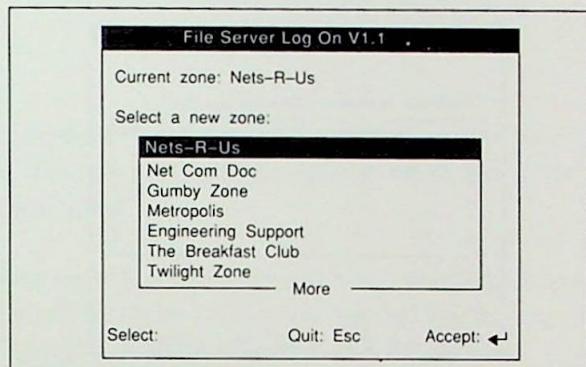

Figure 3

Figure 4

Figure 5

```
         File Server Log On  V1.1


    Mark  the  additional  volume(s)  you  need:

  ✓ MarkPlus
    TestVol




    Select:     ←→        Quit: Esc      Accept: ↵
```

Figure 6

```




        You have mail waiting for you.



                              OK:     ↵



```

Figure 7

```
         AppleShare  Startup  V1.0


      Log off from file servers

      Return to startup application

      Shut Down





    Select:                    Accept:    ↵
```
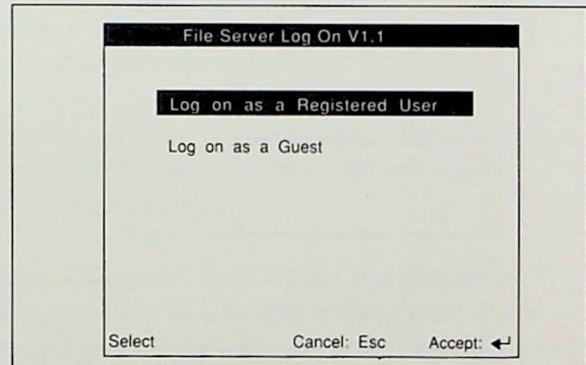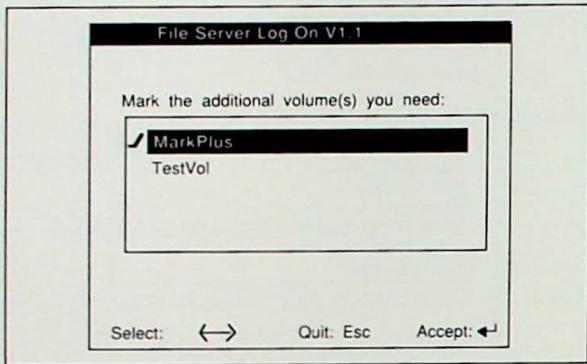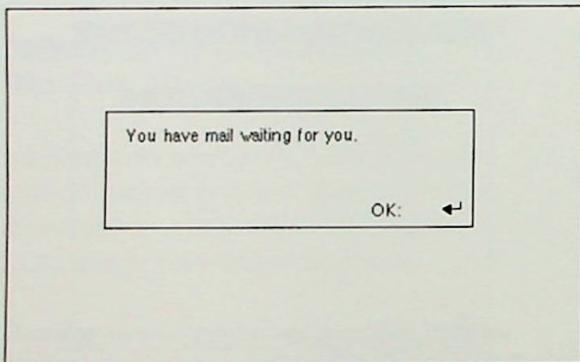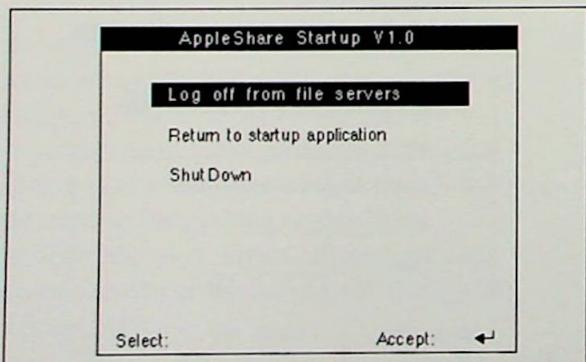
Figure 8

Press the left-arrow key to remove the check mark next to the selected volume; press the right-arrow key to put a check mark next to the selected volume. Note that the user volume (the volume with the Users folder and the folders for all of the users) is automatically checked and cannot be unchecked. This volume will become your boot volume.

Once you have selected any additional volumes, the boot process continues. Setup files, desk accessories, file system translators, and drivers are loaded from the user volume. Eventually, the startup application on the user volume is run. If you have installed the network booting software normally, this is the "/System/Start" file, and the process continues as described in the next paragraph.

The startup application first loads any custom setup files and desk accessories found in your user folder ("/Users/Your Name/Setup"). Note that these are loaded in addition to the systemwide files loaded at boot time from the usual places in the System Folder. Next, your mail folder ("/Users/Your Name/Mail") is checked; you will be told whether you have mail waiting (see Figure 7). Your default printer is set to the printer named in your ATINIT file (as set up in AppleShare Admin). Next, prefix 0 is set to the prefix in the ATINIT file, and then the user's startup application named in the ATINIT file is launched.

If the user's startup program quits, control returns to the AppleShare Startup program (described in the next section).

AppleShare Startup

If your startup application quits, control is returned to the AppleShare Startup program ("/System/Start") and the AppleShare Startup screen is displayed (Figure 8). This screen displays three options: log off from all file servers, return to the startup application, and shut down (reboot).

- Selecting "Log off from file servers" logs the workstation off from all file servers. You or another user may log on again, starting with the screen shown in Figure 2 (or Figure 4, if there are only one zone and one file server to choose from). Once the new user logs on, that user's startup application is launched.

  Note that the operating system is not reloaded, and no custom desk accessories or setup files are loaded for the new user. Typically, a student selects this option at the end of a class, so that the next student to use the workstation can log on without having to reboot the system completely.

- Selecting "Return to startup application" checks for mail and reruns your startup application as if you had just logged on (custom setup files and desk accessories are not reloaded). Select this option if you accidentally quit your startup application and want to launch it again.

- Selecting "Shut Down" logs the workstation off from all file servers, ejects all disks, and reboots the workstation. This function is similar to the Restart option of the "Shut Down" command in the Finder. The Shut Down option should be used when you have loaded custom desk accessories or setup files and you don't want them to be installed when the next user logs on.

  If you install the Quick Logoff update (part of the Installer option in Apple IIGS System Software Version 5.0.2), the AppleShare Startup screen (Figure 8) is skipped and AppleShare acts as though the first option, "Log off from file servers," was selected.

Note: When a user quits from the Aristotle network management software, the workstation is rebooted. Aristotle was designed this way so that students would not have to run a separate log-off program. Configured as such, Aristotle cannot take advantage of the Quick Logoff update.

To allow Aristotle to make use of Quick Logoff, Apple includes an update program that modifies Aristotle. With this modification, Aristotle determines what type of workstation it is operating on before rebooting. If operating on an Apple IIe, Aristotle reboots as usual. On an Apple IIGS, Aristotle performs a ProDOS 8 QUIT call to return control to the AppleShare Startup application.

✍

AppleShare File Server: Recommended Memory

A Macintosh computer used as an AppleShare file server requires about 1 megabyte of RAM for the file server alone; any memory beyond 1 megabyte is allocated to RAM cache, cache directory structures, and user data files. As the cache size increases, more of the disk directory can be maintained in memory, resulting in fewer disk accesses and faster response.

To run only the AppleShare file server, 1 or 2 megabytes of installed memory is recommended. A 1-megabyte Macintosh server can support 25 concurrent users. A 2-megabyte Macintosh II can support 50 concurrent users.

In general, 1 additional megabyte of RAM is quite adequate for cache memory. More memory won't bring further improvement.

To run the AppleShare File Server with the AppleTalk Internet Router* or the AppleShare Print Server—or both—the minimum memory requirement is 2 megabytes. However, you should have about 4 megabytes to provide additional memory for the file server RAM cache.

*Look for more information on internet routers in the next publication of the *Education Technical Bulletin*.
✍

The Graphic Exchange

The Graphic Exchange, from Roger Wagner Publishing, is a graphics conversion utility that allows Apple IIGS users to exchange virtually any Apple II graphic image between different applications. For example, you can convert a Print Shop graphic to a Super Hi-Res image for use with Print Shop GS, Paintworks, Deluxe Paint, 816/Paint, MultiScribe, and other programs. You can also extract portions of any graphic screen and turn them into your own clip art.

The figure at right shows a screen display from The Graphic Exchange. The program loads a picture in any of the listed formats, converts all or a portion of the screen (rescaled, if necessary) to any of the other formats, and then saves the new file to disk. You can have one picture in each format in memory at the same time, making it easy to move back and forth as you convert and edit the graphics.

Colors are automatically preserved wherever possible, and you can also choose to ignore the background color when transferring an image, superimposing only the image you want on the destination screen.

The Graphic Exchange	Copyright (C) Techflow Pty. Ltd.				Esc : Main menu	
Display graphic	Normal lo-res	/ Col	/ 40	X	40	
Standard transfer	Double lo-res	/ Col	/ 80	X	40	
Scaled transfer	Normal hi-res	/ Col	/ 140	X	192	
Full screen transfer	Normal hi-res	/ Col	/ 280	X	192	
Exchange black and white	Normal hi-res	/ Mon	/ 280	X	192	
Clear graphic	Double hi-res	/ Col	/ 140	X	192	
Restore standard palettte	Double hi-res	/ Mon	/ 560	X	192	
Set background color	320 super-res	/ Col	/ 320	X	200	
Undo last change	640 super-res	/ Col	/ 320	X	200	
	640 super-res	/ Mon	/ 640	X	200	
Catalog	Print Shop	/ Mon	/ 88	X	52	
Load graphic	Print Shop GS	/ Col	/ 88	X	52	
Save graphic	Newsroom clip	/ Mon	/ 245	X	192	
Slide show	Newsroom photo	/ Mon	/ 231	X	168	
Create data disk	Macpaint doc	/ Mon	/ 576	X	720	
Select graphics mode to display			Background color : None			

The Graphic Exchange can directly read Macintosh disks (400K and 800K; MFS or HFS), after which the image can be converted to other formats. Although it cannot write to a Macintosh disk, The Graphic Exchange can copy Macintosh graphics to an Apple II ProDOS disk using the Apple File Exchange utility.

To use The Graphic Exchange, you need an Apple IIGS computer with at least 768K of memory.

For further information, contact Roger Wagner Publishing as follows:
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Printing from an Apple IIGS with One Floppy Disk Drive

You can assemble an Apple IIGS system disk that contains the Chooser and associated AppleTalk software, so that you can use an Apple IIGS with one 3.5-inch floppy disk drive to run applications and print to a networked ImageWriter II printer.

Because AppleTalk software for the Apple IIGS computer is contained within GS/OS, start by using the GS/OS Installer to make a GS/OS startup disk. Using the GS/OS 5.0.2 System.Disk and System.Tools disks, follow the steps below. (Note that these instructions provide a network printing solution; they do not provide file server access.)

1. Install the "AppleShare on a 3.5 Disk" script.

2. Once the script has installed successfully, select the "AppleShare" script (not AppleShare on a 3.5 Disk) and click Remove.

3. Select the "AppleTalk ImageWriter" script and click Install.

The resulting startup disk provides access to the networked ImageWriter. It contains all the system files needed to run both GS/OS applications and ProDOS 8 applications. Chooser.II is not needed because you'll use the Graphic Control Panel.

Once the Apple IIGS startup process reaches the Finder, use the Graphic Control Panel's AT ImageWriter DEV to select the desired network ImageWriter. Your selection is stored in RAM for use by AppleTalk protocols, and written into the CDEV resource file for use on the next startup; you will not have to select it again.

Click the Drive button to eject the GS/OS startup disk, insert the application disk, and double-click the application icon. Within the application, specify the correct slot information about the printer (Slot 1 for 03 ROMs, or Slot 7 for 01 ROMs). The application will then work in a one-drive environment. When you quit the application, the system returns to the Finder.

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Apple IIGS: Apple Access II Setup and Startup Issues

This article describes several issues that affect the successful use of Apple Access II communications software.

Version 1.2 Configuration Requirements

Apple Access II Version 1.2 limits the Apple IIGS system configuration of Slots 1 and 2, and requires changes in the default settings of the modem port.

The software works properly only when Slots 1 and 2 are set up in their default configurations from the Control Panel. Select the Slots menu item in the Control Panel, and configure the slots as follows:

- Slot 1: Printer Port
- Slot 2: Modem Port
- Slot 7: Your Card

Under the Modem Configuration menu item in the Control Panel, set Device Connected to Modem.

You must also change the default settings of the modem port, as follows:

1. Open the Control Panel.
2. Select DCD Handshake, and choose No.
3. Select DSR/DTR Handshake, and choose No.
4. Press Return to save your changes.
5. Turn off the computer and turn it on again before starting Access II.

The Modem Port settings should look like this:

Device Connected: Modem	Baud: 1200
Line Length: Unlimited	Data/Stop Bits: 8/1
Delete first LF after CR: No	Parity: None
Add LF after CR: No	DCD Handshake: No
Echo: No	DSR/DTR Handshake: No
Buffering: No	XON/XOFF Handshake: No

Disk Contents: Avoiding Confusion

One side of the Access II 5.25-inch disk is for use with 80-column systems, and the other is for 40-column systems (Apple II computers without 80-column cards).

If the 80-column side of the disk is inserted face up into the drive, the software begins startup expecting to find an 80-column card. If it doesn't find one, it looks for the 40-column software, which is on the other side of the disk. You'll see the following message:

```
Cannot find CON40
```

Eject the disk, turn it over, and reinsert it.

You'll see the same message when you start up the 80-column side of the software on an Apple IIGS with Slot 3 set to "Your Card," and something other than an 80-column card installed in Slot 3. In the Control Panel, set Slot 3 to "Built-in Text Display," or turn the disk over to use it in 40-column mode.

When you insert the 40-column side of the disk into an 80-column system, you will see the following message:

```
Cannot find CON80
```

Eject the disk, turn it over, and reinsert it.

File Deletions: Creating More Space

Because there is very little space available on the disk, the Access II master disk is locked. When Access II starts up, it tries to open a recording file (a file that logs on-line activity). With a locked disk, this results in an error; there isn't enough space to open the file.

You must make an unlocked working disk. Then, if you use the 80-column format, delete the following files from your working disk:

UT40.SYSTEM
ACS40.SYSTEM
CON40

If you use the 40-column format, delete the following files from your working disk:

UT80.SYSTEM
ACS80.SYSTEM
CON80

While these deletions make the disk unusable for the deleted format, you now have more than 100 blocks free for saving data. To make the disk usable for the format you deleted, copy the deleted files from the master to your backup disk.

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